

Reduced-gravity measurements of the effect of oxygen on properties of zirconium

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The influence of oxygen on the thermophysical properties of zirconium is being investigated using MSL-EML (Material Science Laboratory Electromagnetic Levitator) on ISS (International Space Station) in collaboration with NASA, ESA, and DLR. Zirconium samples with different oxygen concentrations will be put into multiple melt cycles, during which the density, viscosity, surface tension, heat capacity, and electric conductivity will be measured at various undercooled temperatures. The facility check-up of MSL-EML and the first set of melting experiments have been successfully performed in 2015. The first zirconium sample will be tested near the end of 2015. As part of ground support activities, the thermophysical properties of zirconium and Zr-O were measured using a ground-based electrostatic levitator located at the NASA Marshall Space Flight Center. The influence of oxygen on the measured surface tension was evaluated. The results of this research will serve as reference data for those measured in ISS.